

BOOKS

ences with the more quantitative side of astrophysics was also enlightening. I was particularly struck by the foreword by Kent Cullers, who writes that the book “whets the appetite for real science.” It certainly did for me, as did Cullers’s personal story: He is a blind scientist who made a career in astronomy. His example convinced me that I too could work in the space sciences.

Although the book was written for

readers as young as 10 years old, it can also be enjoyed by college students and adults. Younger readers will appreciate that when a scientist, spacecraft, or scientific word is mentioned for the first time, it is underlined and, in the latter case, defined. With its myriad of tactile graphics—there are 19 figures in all, some with multiple panels—*Touch the Stars* throws open the doors of the universe to blind people. Readers who are

especially intrigued by specific topics will find ample jumping-off points for further exploration.

Grice’s book got me “touching” the stars all those years ago and started my journey in astronomy. I have no doubt that the new edition will do the same for many other students.

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Constructing DNA, once again

James Watson and Francis Crick’s discovery of the structure of DNA in 1953 is one of the most famous episodes in the history of biology. The story became notorious early on when Watson published his 1968 memoir *The Double Helix: A Personal Account of the Discovery of the Structure of DNA*. In that book, Watson famously insulted not only Crick but Rosalind Franklin, the scientist whose crucial x-ray image of DNA was shown to the two men without her permission. Tragically, Franklin died not long after that incident, which meant that she was ineligible for the Nobel Prize in Physiology or Medicine awarded to Watson, Crick, and Maurice Wilkins in 1962.

DNA is well known not only because drama surrounded the discovery of its structure but because its sequence of nucleotides encodes genetic information in all organisms. Moreover, its structure suggests its mechanism of replication, which ensures that its information content is passed along to future generations. But DNA is, in fact, a somewhat monotonous macromolecule: Regardless of the specific nucleotide sequence or organismal source, all DNA molecules are practically chemically identical.

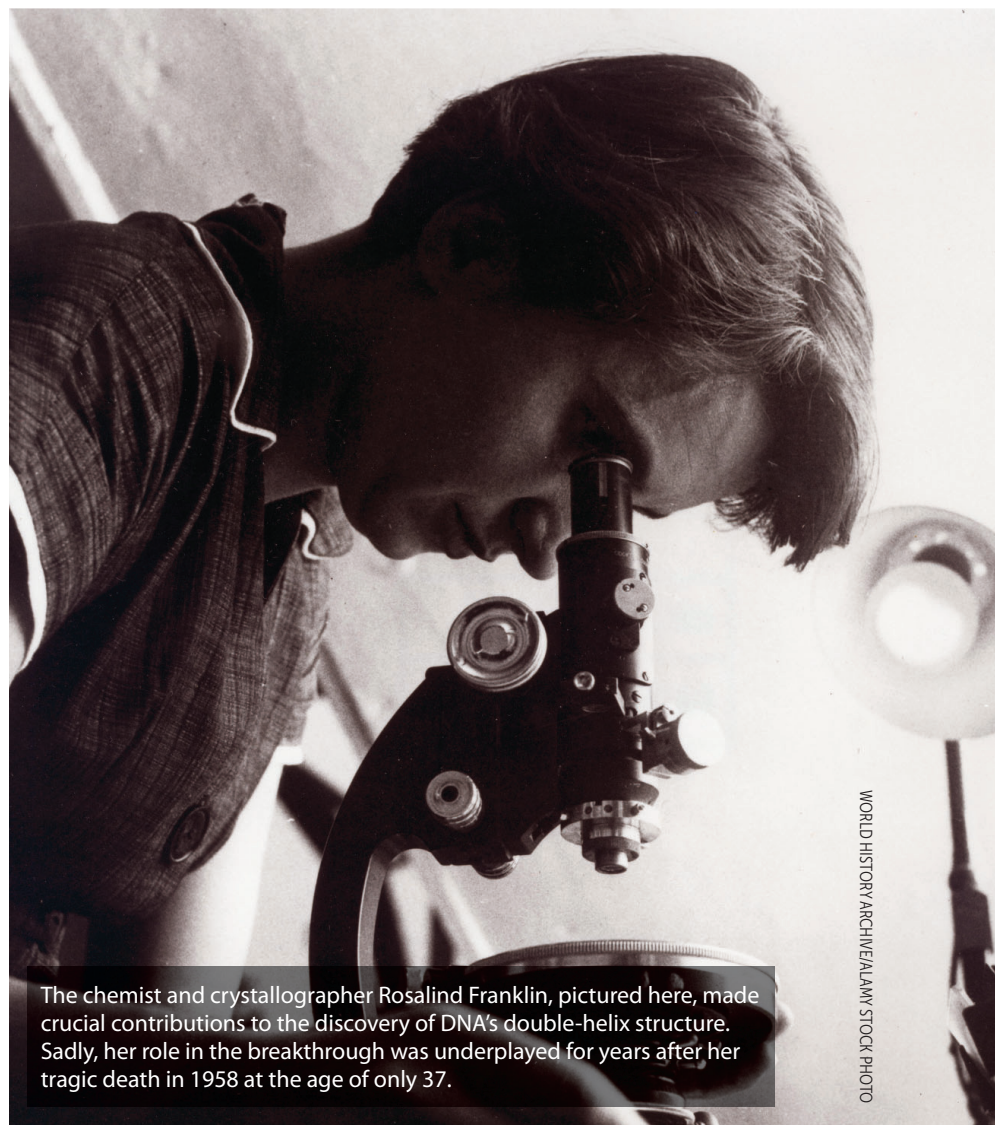
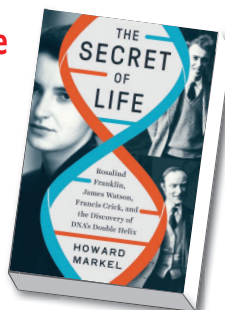
That property was exploited in the last part of the 20th century, when biolo-

gists devised a standard set of procedures to manipulate DNA and express foreign genes in bacteria and other organisms, which gave rise to the biotech

industry. That industry fueled the mythologization of DNA as the alleged “secret of life” (a phrase that was first used to describe DNA in *The Double Helix*).

The Secret of Life
Rosalind Franklin,
James Watson,
Francis Crick, and
the Discovery of
DNA’s Double Helix

Howard Markel
W. W. Norton, 2021.
\$30.00



The chemist and crystallographer Rosalind Franklin, pictured here, made crucial contributions to the discovery of DNA’s double-helix structure. Sadly, her role in the breakthrough was underplayed for years after her tragic death in 1958 at the age of only 37.

WORLD HISTORY ARCHIVE/ALAMY STOCK PHOTO

The image of its double helix is frequently invoked to lend an air of cutting-edge science to consumer products, among other things: It was even used as the body of the seahorse in the modernized logo of the venerable Marine Biological Laboratory in Woods Hole, Massachusetts.

The Secret of Life is also the title of a new book by Howard Markel, a well-known historian of medicine. At more than 400 pages, the book is long but readable, and it retells the story of DNA from Crick's appearance as an aging graduate student at the Cavendish Laboratory at Cambridge University—where he met Watson—to the awarding of the 1962 Nobel Prize to Watson, Crick, and Wilkins. Considerable space is spent discussing the misogyny Franklin faced at Cambridge and King's College London, which were both prototypical old boys' clubs, and from the international scientific community.

One of Markel's goals is to make sure that Franklin's important contributions are acknowledged to be as significant as those of such players as Watson, Crick, Wilkins, and the physical chemist Linus Pauling. Markel also mentions John Randall, Franklin's boss, because of his role in the conflicts between the scientists looking for the structure of DNA. Although the details are still fuzzy, Randall apparently assigned Franklin to the DNA project without realizing that Wilkins, who was friendly with Crick, was still working on it. That created tension in the laboratory, which ultimately sidelined Franklin.

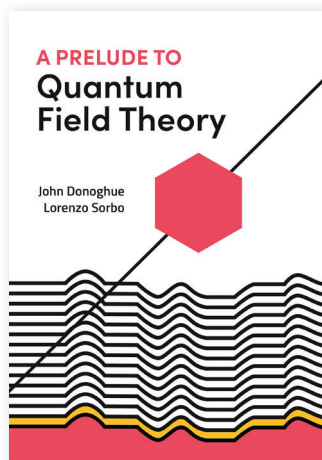
But do we need another book telling the DNA story? Watson's memoir is self-centered but still informative. Horace Freeland Judson's *The Eighth Day of Creation: Makers of the Revolution in Biology* (1979) provides a more detailed—although somewhat hagiographic—account based on extensive interviews with the main scientists involved. Robert Olby's slightly earlier *The Path to the Double Helix: The Discovery of DNA* (rev. ed., 1994) is a valuable scholarly work suitable for students interested in a scientific history of the discoveries. And most recently, Brenda Maddox's *Rosalind Franklin: The Dark Lady of DNA* (2002) earned well-deserved praise for righting the wrongs in Watson's depiction of Franklin and placing her firmly in the pantheon of scientists who were crucial to discovering DNA's structure.

Nevertheless, as Markel realized when teaching his medical students before writing *The Secret of Life*, younger generations do not know or understand what happened almost 70 years ago now. Markel relied heavily on the earlier books on those subjects, but he also dipped into Judson's archives for more information and personally interviewed Watson and others. His book is thorough, but it does not provide any new insights, and it is somewhat disappoint-

ing that he does nothing to puncture the most egregious exaggerations of the DNA myth, such as claims that the human genome sequence is the "blueprint for life." Nevertheless, he provides a refreshed look at how it all started. It will be a compelling read for not only his medical students but many others.

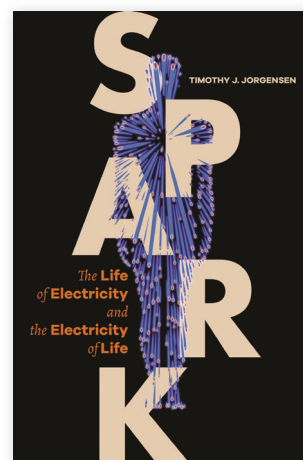
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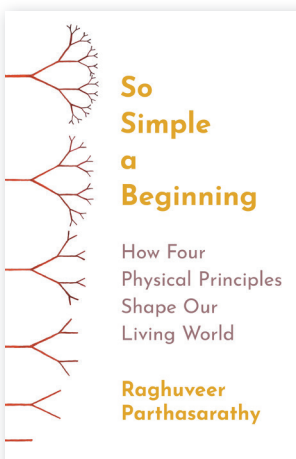
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